

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 734 097 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
24.06.1998 Bulletin 1998/26

(51) Int Cl.⁶: **H01R 9/07, H01R 4/24**

(21) Application number: **95120602.8**

(22) Date of filing: **27.12.1995**

(54) **A circuit member and an electrical connection box**

Ein Bauelement für eine Schaltung und eine Anschlussdose

Élément de circuit et boîte de contact électrique

(84) Designated Contracting States:
DE GB

(30) Priority: **15.02.1995 JP 27027/95**

(43) Date of publication of application:
25.09.1996 Bulletin 1996/39

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Description

The present invention relates to a circuit member for forming a desired circuit for an electrical connection box and an electrical connection box.

An electrical connection box used to establish branch connections between wiring harnesses for an automotive vehicle and a variety of electrical devices is designed to concentrate points of branch connection in one place and realize a rational and economical wiring. As the wiring harnesses get more and more compact, a variety of electrical connection boxes for different types of vehicles and different purposes are being developed.

The aforementioned electrical connection boxes include the one in which a circuit is formed by, after one wire is arranged on an inner surface of each of lower and upper casings, connecting cramping terminals with the desired wires to establish an electrical connection.

This electrical connection box requires an apparatus for arranging or forming wires. Upon a change of the circuit, such an apparatus also needs to be changed. Further, when the circuit is complicated, it takes time to arrange the wires.

A connector for connecting flat cables as shown in FIGS. 5(A) and 5(B) is known (see Japanese Unexamined Patent Publication No. 56-13674). Specifically, a lower flat cable 3 is fitted in grooves 1a formed in the inner surface of a lower casing 1, and an upper flat cable 4 is fitted in grooves 2a formed in the inner surface of an upper casing 2 such that the flat conductor member 3 and 4 extend in directions normal to each other. Lower wire contact portions 6a of cramping terminals 6 secured on a connector main body 5 between the lower casing 1 and the upper casing 2 are connected with wires 3a of the lower flat cable 3, whereas upper wire contact portions 6b of the cramping terminals 6 are connected with wires 4a of the upper flat cable 4.

In the above prior art connector, a circuit can be formed by connecting the wires 3a of the lower flat cable 3 and the wires 4a of the upper flat cable 4 by means of the cramping terminals 6.

However, in the prior art connector, the grooves 1a and 2a for positioning the flat conductor member 3 and 4 need to be formed in the inner surfaces of the lower and upper casing 1 and 2, thereby making the structure of the casings complicated and leading to an increased production cost. Further, if the spacing between the wires of the flat conductor members and the wire extending directions differ depending upon the circuit construction, this connector cannot be used to form different circuits.

Further, it is necessary to separately provide the connector main body 5 and to bury and secure intermediate portions 6c of the respective cramping terminals 6 in the connector main body 5. This increases the number of parts, a production cost due to an increased labor, and the thickness of the casings 1 and 2 by the thickness of the connector main body 5.

Furthermore, since the respective cramping terminals 6 are buried and secured, it is difficult to respond to a change of the circuit.

The US-A-4 249 303 discloses an electrical connection box, in which two flat multiconductor cables are connected with one cable placed atop of another to provide a matrix of zones, in which connections may be made of any conductor of one cable to any conductor of the other cable. Selection is made of one zone and it is perforated. A connector in the form of a bent metal plate is then inserted through the previously provided perforation to provide an electrical connection between the pair of cable conductors in registry with the selected zone.

It is an object of the present invention to provide a circuit member and an electrical connection box, which are easy to produce.

This object is achieved by a circuit member having the features of claim 1 and by an electrical connection box having the features of claim 10. Preferred embodiments are defined in the dependent subclaims.

Specifically by connecting a cramping terminal with a wire of the one flat conductor member by inserting its wire contact portion through the connecting portion of the other stacked flat conductor member it is possible to easily interconnect two or more wires. In case of an error the cramping terminal may be in particular withdrawn, therefore reducing the production rejects or waste.

Furthermore one cramping terminal may be only connected to a wire of one flat conductor through the connecting portion of the other superposed flat conductor member, therefore increasing the connection possibilities and thus the number of possible circuit layouts.

According to the invention, there is provided a circuit member for forming a desired circuit for an electrical connection box, comprising: a plurality of flat conductor members each having a plurality of wires covered by wire coatings of insulating material, two adjacent wire coatings being connected by connecting portions of the insulating material, and adjacent flat conductor members being arranged or superposed one over another and rotationally shifted by a desired angle, and

cramping terminals inserted into at least one flat conductor member, wherein one or more wire contact portions of each of the cramping terminals are electrically connected with predetermined wires, wherein one or more cramping terminals thereof are connected with predetermined wires of one flat conductor member with the one or more wire contact portions inserted through the connecting portion of the other flat conductor member.

According to a preferred embodiment, the flat conductor members are mechanically connectable with one another by the cramping terminals in a self-supporting manner.

Preferably, the cramping terminals are insertable from one and/or the other side of the flat conductor members into at least one flat conductor member in

specified positions.

Further preferably, the cramping terminals are mountable or attachable to at least one of the flat conductor members.

According to a further preferred embodiment, each cramping terminal has at least one wire contact portion preferably formed with cutters, the wire contact portion being electrically connected with the respective wire.

Preferably, there are provided spaces between flat connecting portions of the flat conductor members.

Further preferably, the cramping terminals electrically connect the predetermined or predeterminable wires with external terminals, in particular by means of tabs formed thereat or connect the predetermined or predeterminable wires of the same flat conductor member and/or the wires of the different flat conductor member.

According to a further preferred embodiment, each cramping terminal has such a length that it can be simultaneously connected with the wires of at least two superposed flat conductor members, in particular when the cramping terminal is inserted into the flat conductor member from above or below.

Preferably, portions of the flat conductor members which are not required for the circuit are cut off.

According to the invention, there is further provided an electrical connection box, comprising at least one circuit member according to one embodiment of the invention and a casing being formed with terminal holes, wherein the circuit member is mounted inside the casing such that the cramping terminals of the circuit member project from the terminal holes.

According to a preferred embodiment of the invention, ribs are formed on portions of an inner surface of the casing, and wherein the circuit member is preferably mounted such that it is in contact with the ribs and a clearance is formed between the circuit member and the inner surface of the casing.

Particularly, the invention is designed to form the circuit member separately from the electrical connection box such that the electrical connection box can be assembled only by mounting the circuit member in a casing of the electrical connection box. In other words, the invention is designed to facilitate a circuit change and to make the entire electrical connection box thinner and the casing thereof simpler.

According to a preferred embodiment of the invention, there is provided a circuit member to be housed in an electrical connection box, being adapted to form a desired circuit, comprising:

a plurality of substantially rectangular flat conductor member in which a plurality of wires are arranged in parallel at a specified pitch and are thickly covered with insulating resin such that wire coatings bulging upward and downward are connected with flat connecting portions, the flat conductor member being arranged one over another and rotationally

shifted by a desired angle to bring the wire coatings of one flat conductor member into contact with the wire coatings of the other flat conductor member and to provide spaces between the flat connecting portions of one flat conductor member and those of the other flat conductor member, and

cramping terminals to be inserted from above and/or below into the flat conductor member arranged one over another in specified positions and to be securely held in the flat conductor member, each cramping terminal having at least one wire contact portion formed with cutters, the wire contact portion being electrically connected with the wire by penetrating the wire coating of the wire by means of the cutters thereof, wherein the cramping terminals electrically connect the wires with external terminals by means of tabs formed thereat or connect the wires of the same flat conductor member and/or the wires of the different flat conductor member.

Unlike known flat cables, the above flat conductor members have a thick resin sheath which has a rigidity sufficient to securely hold the cramping terminals.

In the above circuit member, a specified number of flat conductor members are arranged one over another and rotationally shifted with respect to each other by a desired angle, e.g. 90°. In this stage, the cramping terminals are directly inserted into the flat conductor members in specified positions so as to connect the desired wires of the flat conductor members or the desired adjacent wires of one flat conductor member, thereby forming the circuit. There are used a variety of cramping terminals. These cramping terminals include, for example, those having at one end a tab to be connected with an external terminal and having at the other end cutters for penetrating the coating of a desired wire to connect this wire with the external terminal or for penetrating the coatings of a plurality of wires of the same flat conductor member or the different flat conductor members to connect these wires with the external terminal, and those used to connect a plurality of wires of the same flat conductor member or a plurality of wires of the different flat conductor members. By connecting the wires of the flat conductor members by means of the cramping terminals, a designed circuit can be formed of the wires arranged in parallel in the flat conductor members. In other words, bending of the wires necessary for the prior art in which the wires are arranged in the casings can be dispensed with, with the result that the wire can be arranged in a more compact manner.

As is clear from the above description of a preferred embodiment, a plurality of flat conductor members formed by molding a plurality of wires arranged in parallel with insulating resin are arranged one over another, and the cramping terminals are directly inserted into the flat conductor members to connect the wires of the different flat conductor members or of the same flat conductor, thereby forming a circuit. The cramping termi-

nals are securely held in the flat conductor members. Accordingly, the circuit member can be formed in advance separately or independently from the casings of the electrical connection box.

Therefore, unlike the prior art, it is not necessary to form positioning grooves in the inner surfaces of the lower and upper casings of the electrical connection box. Further, since the cramping terminals are directly connected with the wires of the flat conductor member(s), the connector main body essential for the prior art is not required. Consequently, the respective casings can be made thinner by the thickness of the connector main body, thereby making the entire electrical connection box thinner, and the number of parts and a labor can be reduced.

Further, since the cramping terminals are directly inserted and connected with the wires of the flat conductor members arranged one over another, the circuit can be easily changed and made more compact.

Furthermore, unlike the prior art electrical connection box in which wires are arranged one by one, an apparatus such as a wire arranging apparatus and a labor required therefor are not necessary.

Further, the wires of the respective flat conductor members can be arranged to intersect at a desired angle. If the wire contact portions of the cramping terminals have such a length that it can simultaneously connect the wires of the different flat conductor members, the cramping terminals can be easily and rapidly mounted from one direction, namely from above or below.

Preferably, each wire contact portion has such a length that it can be simultaneously connected with the wires of the flat conductor member arranged one over another when the cramping terminal is inserted into the flat conductor member from above or below.

Accordingly, the wire contact portion of each cramping terminal has such a length that the cramping terminal can be simultaneously connected with the wires of the insulating flat conductor members arranged one over another. Accordingly, the cramping terminals can be connected with the desired wire(s) only by being inserted from above or below. Further, by extending a horizontal dimension of the cramping terminal by a specified distance, the cramping terminal can connect the wires arranged in parallel in the same flat conductor member.

Further, portions of the rectangular flat conductor members which are not required for the circuit may be cut off. For example, the flat conductor members having the same rectangular shape are arranged one over the other such that the wires of one flat conductor member intersect with the wires of the other flat conductor at right angles, and the specified cramping terminals are inserted into the flat conductor members to form a circuit. Thereafter, the portions of the flat conductor members which are not required for the circuit are cut off by means of a press, thereby completely forming the circuit member.

If the portions of the flat conductor members which

are not required for the circuit are cut off, flat conductor members mass-produced in a given shape can be used efficiently.

According to a preferred embodiment of the invention, there is provided an electrical connection box, comprising lower and upper casings each formed with terminal holes, wherein the preformed circuit member according to claim 1 is mounted in a spaced defined by the lower and upper casings such that the tabs of the circuit member project from the terminal holes formed in the lower and/or upper casings.

Accordingly, the electrical connection box can be completed only by mounting the preformed circuit member in the spaced defined by the upper and lower casings thereof. Accordingly, the electrical connection box can be very easily assembled. Further, formation of the ribs in the inner surfaces of the respective casings prevents the ends of the cramping terminals from coming contact with the inner surface of the respective casings.

Preferably, ribs are formed on inner surface(s) of the lower and/or upper casings and wherein the circuit member is mounted such that it is in contact with projecting ends of the ribs and a clearance is formed between the circuit member and the inner surface of the casing.

Accordingly, formation of the ribs in the inner surfaces of the lower and upper casings prevents the ends of the cramping terminals from coming into contact with the inner surfaces of the respective casings.

In other words, the casings of the electrical connection box are not formed with means for positioning the wires such as the positioning grooves formed in the prior art shown in FIG. 5, and has a simple shape capable of housing a circuit member of any construction so long as the terminal holes are in conformity with the tabs of the circuit member.

These and other objects, features and advantages of the present invention will become more apparent upon a reading of the following detailed description and accompanying drawings in which:

FIG. 1 is an exploded perspective view of an electric connection box according to the invention,

FIG. 2A is a perspective view of an upper flat conductor member, FIG. 2B is a perspective view of a lower flat conductor member, and FIG. 2C is a plan view of wires of the flat conductor members arranged one over the other,

FIGS. 3(A) to 3(G) are perspective views of cramping terminals,

FIG. 4(A) is a perspective view of cramping terminals and upper and lower flat conductor members into which the cramping terminals are inserted, and FIG. 4(B) is a perspective of cramping terminals, upper and lower flat conductor members having a press-cut portion, and

FIG. 5(A) is an exploded perspective view of a prior art connector for connecting flat cables, and FIG. 5

(B) is a perspective view of a prior art cramping terminal.

Hereafter, the invention is described in detail with reference to one illustrated embodiment.

As shown in FIG. 1, a circuit member 20 is formed in advance. In this embodiment, the circuit member 20 is mounted in the interior of an electrical connection box comprising, in particular consisting essentially of thin rectangular lower and upper casings 10 and 11 of synthetic resin.

The lower casing 10 and the upper casing 11 are assembled by fitting the inner surfaces of the side walls of the upper casing 11 over the outer surfaces of the side walls of the lower casing 10 and by engaging locking claws 10a of the lower casing 10 with locking holes 11a of the upper casing 11.

Upward projecting connector receptacles 11b to 11d are formed on the upper surface of the upper casing 11.

Ribs 10b for lifting the wires are formed in specified positions of the inner bottom surface of the lower casing 10. Though unillustrated, similar ribs are formed in specified positions of the inner upper surface of the upper casing 11. These ribs 10 reinforce the inner surfaces of the casings 10 and 11 and prevent cramping terminals 13A to 13I to be described later from coming into contact with the inner surfaces of the casings 10 and 11.

As shown in FIGS. 1, 2A and 2B, the circuit member 20 includes flat conductor members 12A and 12B molded such that a plurality of wires a to j and p to y (10 wires in this embodiment) are arranged in parallel and covered with insulating resin sheaths 21, respectively. Each flat conductor member has substantially a rectangular shape in which wire coatings bulging upward and downward are connected by flat connecting portions 22. The connecting portions 22 and the wire coatings 23 are formed so as to conform to a pitch of the cramping terminals. The width of the connecting portions 22 is not limited. The insulating resin sheath 21 is thicker than the sheaths of prior art flat cables so that the respective flat conductor members 12A and 12B have a desired rigidity. A plurality of flat conductor members 12A and 12B (2 flat conductor members in this embodiment) are arranged one over another such that the wire coatings 23 of one flat conductor member are in contact with those of the other conductor member and the flat connecting portions 22 of one flat conductor member are spaced apart from those of the other flat conductor member. In this embodiment, the flat conductor members 12A and 12B are arranged one over the other such that the respective wires a to j of the upper flat conductor member 12A intersect with the respective wires p to y of the lower flat conductor member 12B at right angles. Accordingly, the wires a to j and p to y of the flat conductor members 12A and 12B are arranged as in a checkerboard as shown in FIG. 2C in which solid lines extending in the lateral direction represent the wires a to j and broken

lines extending in the vertical direction represent the wires p to y.

On the other hand, each of the cramping terminals 13A to 13G shown in FIGS. 3(A) to 3(G) basically includes a wire contact portion(s) 13a to be inserted into the flat conductor members 12A and 12B from above the flat conductor member 12A or from below the flat conductor member 12B to be connected with a desired one(s) of the wires a to j or p to y. Each wire contact portion 13A is formed with a slot 13b. Cutters 13c are provided along the inner edges of the slot 13b.

The cramping terminal 13A of FIG. 3(A) is formed with a tab 13d to be connected with an external terminal above the wire contact portion 13a.

The cramping terminal 13B of FIG. 3(B) is formed with a tab 13d which projects perpendicularly to the upper edge of the wire contact portion 13a above the left part of the wire contact portion 13a. The cramping terminal 13C of FIG. 3(C) is formed with a tab 13d which projects perpendicularly to the upper edge of the wire contact portion 13a above the right part of the wire contact portion 13a.

The cramping terminal 13D of FIG. 3(D) has two wire contact portions 13a, 13a on the opposite sides of an intermediate slot 13e, but has no tab. In other words, the cramping terminal 13D is used to connect the wires, but not to connect the wire with an external terminal.

The cramping terminal 13E of FIG. 3(E) is formed with two wire contact portions 13a, 13a extending at a right angle to each other, and a tab 13d above the left wire contact portion 13a. The cramping terminal 13F of FIG. 3(F) is formed with two wire contact portions 13a, 13a extending at a right angle to each other, and a tab 13d above the right wire contact portion 13a.

The cramping terminal 13G of FIG. 3(G) is formed with two wire contact portions 13a, 13a extending at a right angle to each other, but not with a tab 13d. In other words, the cramping terminal 13G is used to connect wires.

The above eight different cramping terminals 13A to 13G are only examples. Besides these, a variety of differently shaped cramping terminals suited to forming a circuit can be used.

The respective cramping terminals 13A to 13G are used, for example, as shown in FIGS. 1 and 2(C) to form a circuit.

Six cramping terminals 13A are inserted from above to be connected with the right ends of the wires a, g to j of the upper flat conductor member 12A and the left end of the wire h of the upper flat conductor member 12A.

One cramping terminal 13B is inserted from above to be connected with the right end of the wire p of the lower flat conductor member 12B.

Two cramping terminals 13C are inserted from above to be connected with the wires q and w of the lower flat conductor member 12B in their intermediate positions.

Two cramping terminals 13D are inserted from above to connect the wires a and b, i and j of the upper flat conductor member 12A at their right ends.

One cramping terminal 13E is inserted from above to be connected with the left end of the wire i of the upper flat conductor member 12A and with lower end of the wire p of the lower flat conductor member 12B.

One cramping terminal 13F is inserted from below to be connected with the upper end of the wire q of the lower flat conductor member 12B and with the left end of the wire b of the upper flat conductor member 12A.

One cramping terminal 13G is inserted from above to connect the wire g of the upper flat conductor member 12A and the wire w of the lower flat conductor member 12B in their intermediate positions.

As described above, a circuit is formed by directly inserting the cramping terminals 13A to 13G into the flat conductor members 12A and 12B arranged one over another from above or below to connect the desired wires of the different flat conductor members or of the same flat conductor member. In particular, the cramping terminals 13A to 13G may be connected to one or more wires of a flat conductor member 12A, 12B through the flat connecting portion 22 of another conductor member 12A, 12B. The cramping terminals 13A to 13G are securely held in the flat conductor members 12A and 12B having desired thickness and rigidity.

After forming the circuit by mounting the cramping terminals as described above, unnecessary portions of the respective flat conductor members 12A and 12B (cross-hatched portions k, l, m in FIG. 1) are cut off by means of a press. The unnecessary portions may remain uncut.

The circuit member 20 constituting an internal circuit of the electrical connection box is formed in advance as described above. The preformed circuit member 20 is inserted into the interior of the lower casing 10 of the electrical connection box and placed on the bottom lifting ribs 10b such that the tabs of the cramping terminals projecting toward the lower casing 10 project downward through terminal holes 10c formed in the lower casing 10. Subsequently, the upper casing 11 is placed over the lower casing 10 such that the tabs of the cramping terminals projecting toward the upper casing 11 project through terminal holes formed in the upper casing 11. At this stage, the ribs formed on the inner surface of the upper casing 11 come into contact with the upper surface of the upper flat conductor member 12A.

By assembling the electrical connection box in this way, the circuit member 20 is housed in the space defined by the lower and upper casings 10 and 11, and the electrical connection box having a desired circuit construction is obtained.

With the above construction, it is not necessary to form the positioning grooves on the inner surfaces of the lower and upper casings 10 and 11 as in the prior art. Accordingly, a production cost can be reduced. Further, the respective cramping terminals 13A to 13G are di-

rectly inserted and connected with the desired ones of the wires a to j and p to y of the insulating sheet members 12A and 12B arranged one over the other, thereby obviating the need for the connector main body as in the prior art. Therefore, the respective casings 10 and 11 can be made thinner by the thickness of the connector main body. Consequently, the entire electrical connection box can be made thinner.

Further, since the cramping terminals 13A to 13G can be directly inserted and connected with the desired ones of the wires a to j and p to y of the flat conductor members 12A and 12B arranged one over the other, the circuit can be easily changed and made more compact.

Further, unlike the prior art electrical connection box in which wires are arranged one by one, an apparatus such as a wire arranging apparatus and a labor required therefor are not necessary. This also contributes to a reduction in a production cost.

The respective flat conductor members 12A and 12B may be arranged one over the other such that the wires a to j of the upper flat conductor member 12A intersect with the wires p to y of the lower flat conductor member 12B at any desired angles other than right angles.

Further, three or more flat conductor members may be arranged one over another.

Further, as shown in FIG. 4(A), the flat conductor members 12A and 12B arranged one over the other are arranged at two vertical stages, and a cramping terminals 13H or 13I having wire contact portions 13a, 13a at its upper and lower portions may be inserted into the flat conductor members 12A and 12B at the upper and lower stages to establish an electrical connection.

Furthermore, as shown in FIG. 4(B), a length l_2 of the tab 13d of the left cramping terminal 13A may be made longer than a length l_1 of the tab 13d of the right cramping terminal 13A ($l_1 < l_2$) so that the longer tab 13d can project upward from a press-cut portion l of the flat conductor members 12A and 12B at the upper stage.

As is clear from the above description, in the circuit member according to claim 1, a plurality of flat conductor members formed by molding a plurality of wires arranged in parallel with insulating resin are arranged one over another, and the cramping terminals are directly inserted into the flat conductor members to connect the wires of the different flat conductor members or of the same flat conductor, thereby forming a circuit. The cramping terminals are securely held in the flat conductor members. Accordingly, the circuit member can be formed in advance separately or independently from the casings of the electrical connection box.

Therefore, unlike the prior art, it is not necessary to form positioning grooves in the inner surfaces of the lower and upper casings of the electrical connection box. Further, since the cramping terminals are directly connected with the wires of the flat conductor member(s), the connector main body essential for the prior art is not required. Consequently, the respective casings can be

made thinner by the thickness of the connector main body, thereby making the entire electrical connection box thinner, and the number of parts and a labor can be reduced.

Further, since the cramping terminals are directly inserted and connected with the wires of the flat conductor members arranged one over another, the circuit can be easily changed and made more compact.

Furthermore, unlike the prior art electrical connection box in which wires are arranged one by one, an apparatus such as a wire arranging apparatus and a labor required therefor are not necessary.

Further, the wires of the respective flat conductor members can be arranged to intersect at a desired angle. If the wire contact portions of the cramping terminals have such a length that it can simultaneously connect the wires of the different flat conductor members, the cramping terminals can be easily and rapidly mounted from one direction, namely from above or below.

Furthermore, the electrical connection box according to claim 4 can be completed only by mounting the preformed circuit member in the spaced defined by the upper and lower casings thereof. Accordingly, the electrical connection box can be very easily assembled. Further, formation of the ribs in the inner surfaces of the respective casings prevents the ends of the cramping terminals from coming contact with the inner surface of the respective casings.

Claims

1. A circuit member (20) for forming a desired circuit for an electrical connection box, comprising:

a plurality of flat conductor members (12A, 12B) each having a plurality of wires (a-i, p-y) covered by wire coatings (23) of insulating material, two adjacent wire coatings (23) being connected by connecting portions (22) of the insulating material, and adjacent flat conductor members (12A, 12B) being arranged or superposed one over another and rotationally shifted by a desired angle, and cramping terminals (13A-13I) inserted into at least one flat conductor member (12A, 12B), wherein one or more wire contact portions (13a) of each of the cramping terminals (13A-13I) are electrically connected with predetermined wires (a-i, p-y)

characterized in that

one or more cramping terminals (13B, 13C, 13E, 1F) thereof are connected with predetermined wires (a-i; p-y) of one flat conductor member (12A; 12B) with the one or more wire contact portions (13a) inserted through the connecting portion (22) of the other flat conductor member (12B; 12A).

2. A circuit member (20) according to claim 1, wherein the flat conductor members (12A, 12B) are mechanically connectable with one another by the cramping terminals (20) in a self-supporting manner.

3. A circuit member (20) according to one of the preceding claims, wherein the cramping terminals (13A-13I) are insertable from one and/or the other side of the flat conductor members (12A, 12B) into at least one flat conductor member (12A, 12B) in specified positions.

4. A circuit member (20) according to one of the preceding claims, wherein the cramping terminals (13A-13I) are mountable or attachable to at least one of the flat conductor members (12A, 12B).

5. A circuit member (20) according to one of the preceding claims, wherein each cramping terminal (13A-13I) has at least one wire contact portion (13a) formed with cutters, the wire contact portion (13a) being electrically connected with the respective wire (a-i, p-y).

6. A circuit member (20) according to one of the preceding claims, wherein there are provided spaces between flat connecting portions (22) of the flat conductor members (12A, 12B).

7. A circuit member (20) according to one of the preceding claims, wherein the cramping terminals (13A-13I) electrically connect the predetermined or predeterminable wires (a-i, p-y) with external terminals, in particular by means of tabs (13d) formed thereat or connect the predetermined or predeterminable wires (a-i, p-y) of the same flat conductor member (12A, 12B) and/or the wires (a-i, p-y) of the different flat conductor member (12A, 12B).

8. A circuit member according to one of the preceding claims, wherein each cramping terminal (13A-13I) has such a length that it can be simultaneously connected with the wires (a-i, p-y) of at least two superposed flat conductor members (12A, 12B), in particular when the cramping terminal is inserted into the flat conductor member from above or below.

9. A circuit member according to one of the preceding claims, wherein portions (k) of the flat conductor members (12A, 12B) which are not required for the circuit are cut off.

10. An electrical connection box, comprising at least one circuit member (20) according to one of the preceding claims and a casing (10, 11) being formed with terminal holes (10c), wherein the circuit member (20) is mounted inside the casing (10, 11) such that the cramping terminals (13A-13I) of the circuit

member (20) project from the terminal holes (10c).

11. An electrical connection box according to claim 10, wherein ribs (10b) are formed on portions of an inner surface of the casing (10, 11), and wherein the circuit member (20) is preferably mounted such that it is in contact with the ribs (10b) and a clearance is formed between the circuit member (20) and the inner surface of the casing (10, 11).

Patentansprüche

1. Schaltungsbauteil (20) zur Bildung einer gewünschten Schaltung für eine elektrische Anschlußdose, umfassend:

eine Vielzahl flacher Leiterbauteile (12A, 12B), die jeweils eine Vielzahl von mit Leitungsüberzügen (23) eines isolierendem Materials überzogenen Leitungen (a-i, p-y) aufweisen, zwei angrenzende flache Leiterüberzüge (23), die mit Verbindungsabschnitten (22) des isolierenden Materials verbunden sind, und angrenzende flache Leiterbauteile (12A, 12B), die übereinander angeordnet oder überlagert sind und durch eine Drehung um einen gewünschten Winkel versetzt sind, und in zumindest ein flaches Leiterbauteil (12A, 12B) eingesetzte Klammeranschlüsse (13A-131), wobei ein oder mehrere Leitungskontaktabschnitte (13a) von jedem der Klammeranschlüsse (13A-131) elektrisch mit vorbestimmten Leitungen (a-i, p-y) verbunden sind,

dadurch gekennzeichnet, daß

ein oder mehrere Klammeranschlüsse (13B, 13C, 13E, 1F) davon mit vorbestimmten Leitungen (a-i, p-y) eines flachen Leitungsbauteils (12A; 12B) mit dem einen oder mehreren Leitungskontaktabschnitten (13a) durch den Verbindungsabschnitt (22) des anderen flachen Leiterbauteils (12B; 12A) eingesetzt sind.

2. Schaltungsbauteil (20) gemäß Anspruch 1, wobei die flachen Leiterbauteile (12A, 12B) mechanisch miteinander verbindbar sind durch die Klammeranschlüsse (20) in einer selbsttragenden Weise.
3. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei die Klammeranschlüsse (13A-131) einführbar sind von einer und/oder der anderen Seite der flachen Leiterbauteile (12A, 12B) in zumindest ein flaches Leiterbauteil (12A, 12B) in bestimmten Positionen.
4. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei die Klammeranschlüsse

(13A-131) montierbar oder anbringbar an zumindest eines der flachen Leiterbauteile (12A, 12B) sind.

5. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei jeder Klammeranschluß (13A-131) zumindest einen mit Schneiden ausgebildeten Leitungskontaktabschnitt (13a) aufweist, wobei der Leitungskontaktabschnitt (13a) elektrisch mit der jeweiligen Leitung (a-i, p-y) verbunden ist.

6. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei Räume zwischen flachen Verbindungsabschnitten (22) der flachen Leiterbauteile (12A, 12B) bereitgestellt sind.

7. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei die Klammeranschlüsse (13A-131) die vorbestimmten oder vorbestimmbaren Leitungen (a-i, p-y) mit äußeren Anschlüssen elektrisch verbinden, insbesondere mittels daran ausgebildeten Laschen (13d) oder verbinden die vorbestimmten oder vorbestimmbaren Leitungen (a-i, p-y) des gleichen flachen Leiterbauteils (12A, 12B) und/oder der Leitungen (a-i, p-y) der unterschiedlichen flachen Leiterbauteile.

8. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei jeder Klammeranschluß (13A-131) eine solche Länge aufweist, daß er gleichzeitig mit den Leitungen (a-i, p-y) von zumindest zwei überlagerten, flachen Leiterbauteilen (12A, 12B) verbunden werden kann, insbesondere wenn der Klammeranschluß in das flache Leiterbauteil von oben oder unten eingesetzt wird.

9. Schaltungsbauteil (20) gemäß einem der vorherigen Ansprüche, wobei Abschnitte (k) der flachen Leiterbauteile (12A, 12B), die für die Schaltung nicht benötigt werden, abgeschnitten werden.

10. Elektrische Anschlußdose, umfassend zumindest ein Schaltungsbauteil (20) gemäß einem der vorhergehenden Ansprüche und ein mit Anschlußblöchern (10c) ausgebildetes Gehäuse (10,11), wobei das Schaltungsbauteil (20) in dem Gehäuse montiert ist, so daß die Klammeranschlüsse (13A-131) des Schaltungsbauteils (20) von den Anschlußblöchern vorspringen.

11. Elektrische Anschlußdose gemäß Anspruch 10, wobei Rippen (10b) an Abschnitten einer Innenfläche des Gehäuses (10,11) ausgebildet werden, und wobei das Schaltungsbauteil (20) vorzugsweise so gehalten ist, daß es in Berührung mit den Rippen (10b) ist und ein Freiraum zwischen dem Schaltungsbauteil (20) und der Innenfläche des Gehäuses (10,11) ausgebildet ist.

Revendications

1. Organe (20) de circuit destiné à former un circuit voulu pour une boîte de connexion électrique, comprenant :

plusieurs organes conducteurs plats (12A, 12B) ayant chacun plusieurs fils métalliques (a-i, p-y) recouverts par des revêtements (23) d'un matériau isolant, deux revêtements adjacents (23) de fil étant connectés par des parties de connexion (22) du matériau isolant, des organes conducteurs plats adjacents (12A, 12B) étant disposés ou superposés les uns aux autres et décalés en rotation d'un angle voulu, et des bornes d'agrafage (13A-13I) insérées dans au moins un organe conducteur plat (12A, 12B), dans lequel une ou plusieurs parties (13a) de contact avec un fil métallique de chacune des bornes d'agrafage (13A-13I) sont connectées électriquement à un fil métallique prédéterminé (a-i, p-y),

caractérisé en ce que :

une ou plusieurs bornes d'agrafage (13B, 13C, 13E, 13F) sont connectées à des fils métalliques prédéterminés (a-1 ; p-y) d'un organe conducteur plat (12A ; 12B), une ou plusieurs parties de contact avec des fils métalliques (13a) étant insérées dans la partie de connexion (22) de l'autre organe conducteur plat (12B ; 12A).

2. Organe de circuit (20) selon la revendication 1, dans lequel les organes conducteurs plats (12A, 12B) peuvent être connectés mécaniquement mutuellement par les bornes d'agrafage (20) afin qu'ils se supportent d'eux-mêmes.

3. Organe de circuit (20) selon l'une des revendications précédentes, dans lequel les bornes d'agrafage (13A-13I) peuvent être insérées par un côté et/ou l'autre côté des organes conducteurs plats (12A, 12B) dans au moins un organe conducteur plat (12A, 12B) en position spécifiée.

4. Organe de circuit (20) selon l'une des revendications précédentes, dans lequel les bornes d'agrafage (13A-13I) peuvent être montées sur l'un au moins des organes conducteurs plats (12A, 12B) ou séparées de cet organe.

5. Organe de circuit (20) selon l'une des revendications précédentes, dans lequel chaque borne d'agrafage (13A-13I) a au moins une partie de contact avec un fil métallique (13a) formée avec des organes de coupe, la partie de contact avec un fil métallique (13a) étant connectée électriquement au

fil métallique respectif (a-i, p-y).

6. Organe de circuit (20) selon l'une des revendications précédentes, dans lequel des espaces sont placés entre les parties plates de connexion (22) des organes conducteurs plats (12A, 12B).

7. Organe de circuit (20) selon l'une des revendications précédentes, dans lequel les bornes d'agrafage (13A-13I) connectent électriquement des fils métalliques prédéterminés ou qui peuvent être prédéterminés (a-i, p-y) à des bornes externes, en particulier à l'aide de pattes (13d) formées sur elles, ou connectent les fils métalliques prédéterminés ou qui peuvent être prédéterminés (a-i, p-y) du même organe conducteur plat (12A, 12B) et/ou les fils métalliques (a-i, p-y) de l'organe conducteur plat différent (12A, 12B).

8. Organe de circuit selon l'une des revendications précédentes, dans lequel chaque borne d'agrafage (13A-13I) a une longueur telle qu'elle peut être connectée simultanément aux fils métalliques (a-i, p-y) d'au moins deux organes conducteurs plats superposés (12A, 12B), en particulier lorsque la borne d'agrafage est insérée dans l'organe conducteur plat par-dessus ou par-dessous.

9. Organe de circuit selon l'une des revendications précédentes, dans lequel des parties (k) des organes conducteurs plats (12A, 12B) qui ne sont pas nécessaires pour le circuit sont coupées.

10. Boîte de connexion électrique comprenant au moins un organe de circuit (20) selon l'une des revendications précédentes et un boîtier (10, 11) formé avec des trous (10c) de passage de borne, dans lequel l'organe de circuit (20) est monté à l'intérieur du boîtier (10, 11) afin que les bornes d'agrafage (13A-13I) de l'organe de circuit (20) dépassent des trous (10c) de borne.

11. Boîte de connexion électrique selon la revendication 10, dans lequel des nervures (10b) sont formées sur les parties de la surface interne du boîtier (10, 11), et dans lequel l'organe de circuit (20) est monté de préférence afin qu'il soit au contact des nervures (10b) et qu'un espace soit formé entre l'organe de circuit (20) et la surface interne du boîtier (10, 11).

FIG. 1

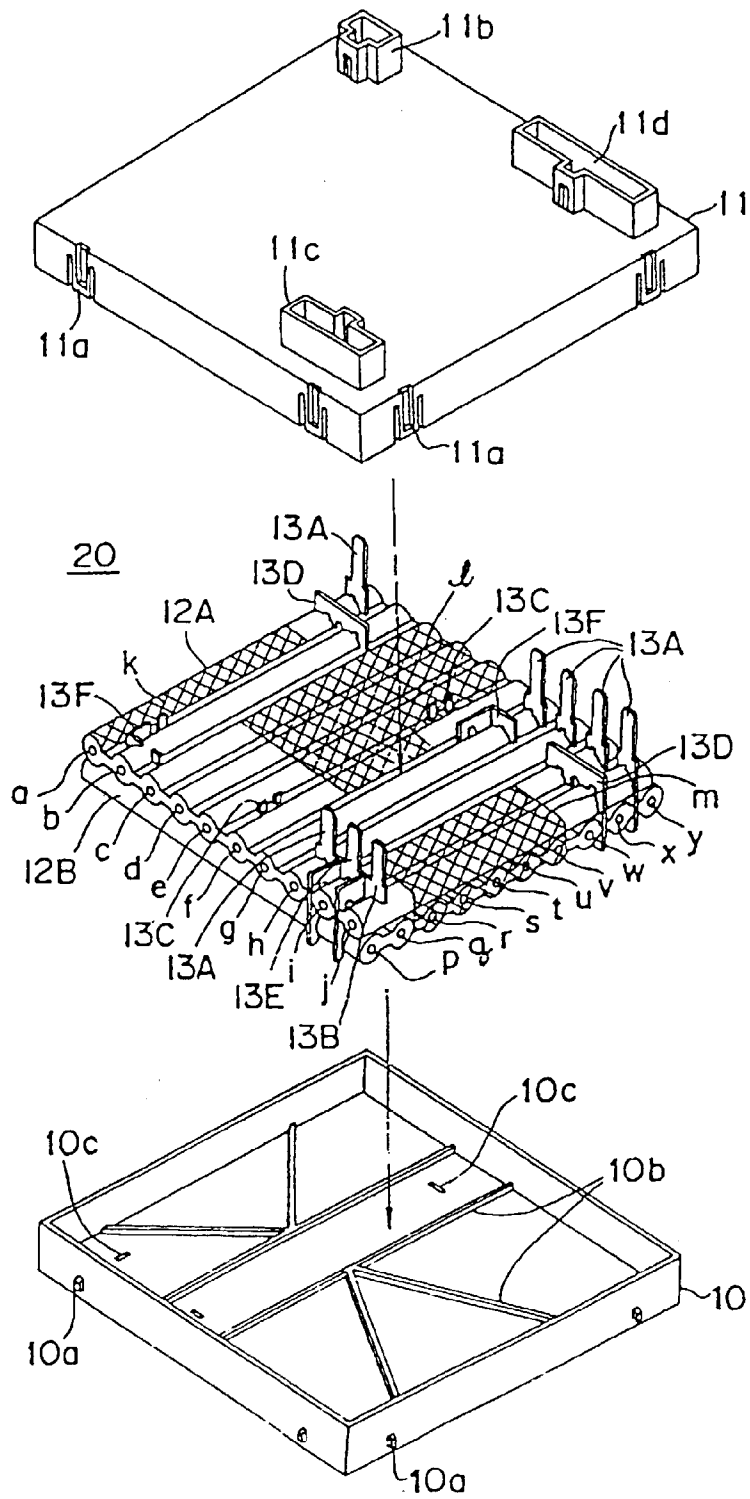


FIG. 2

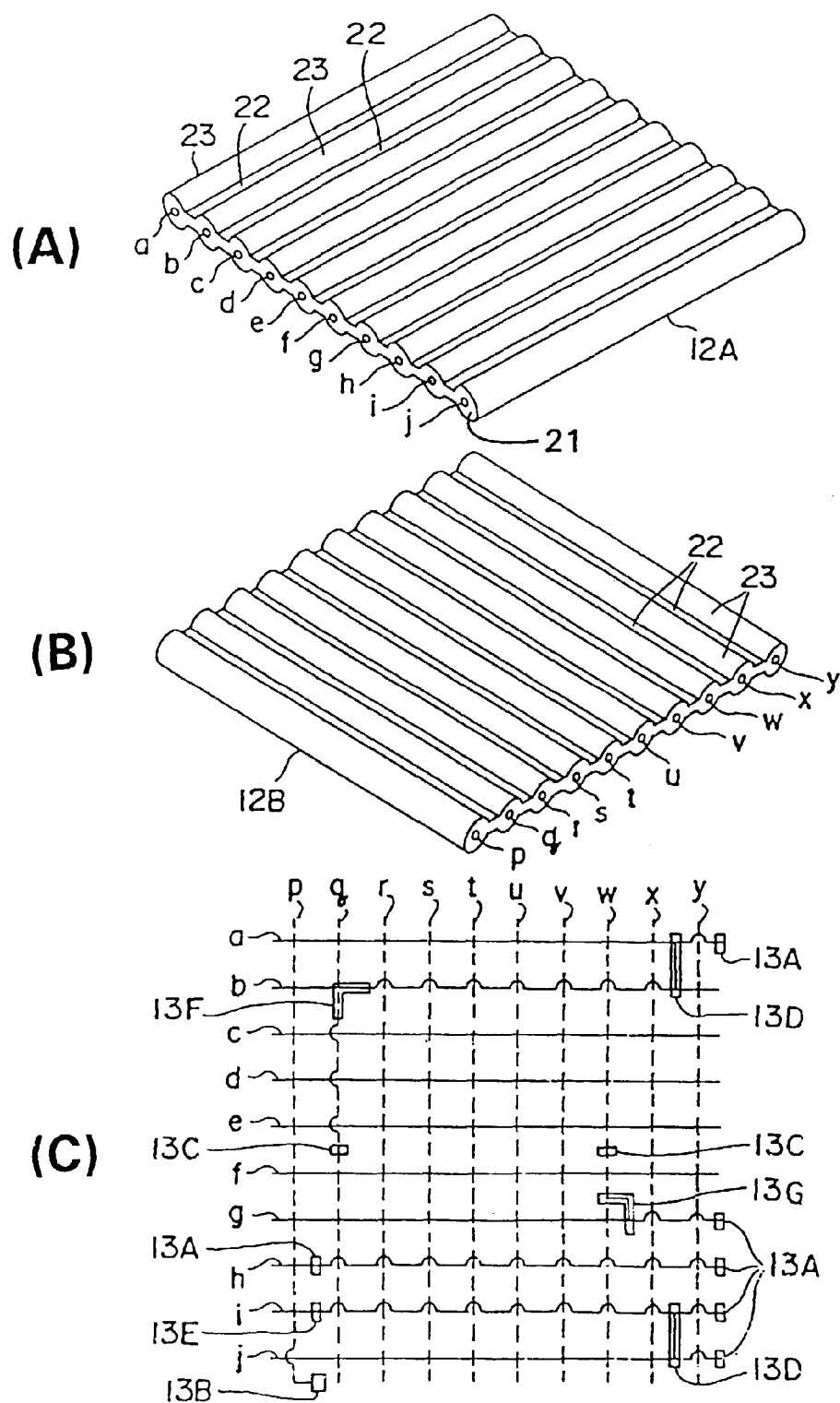


FIG. 3

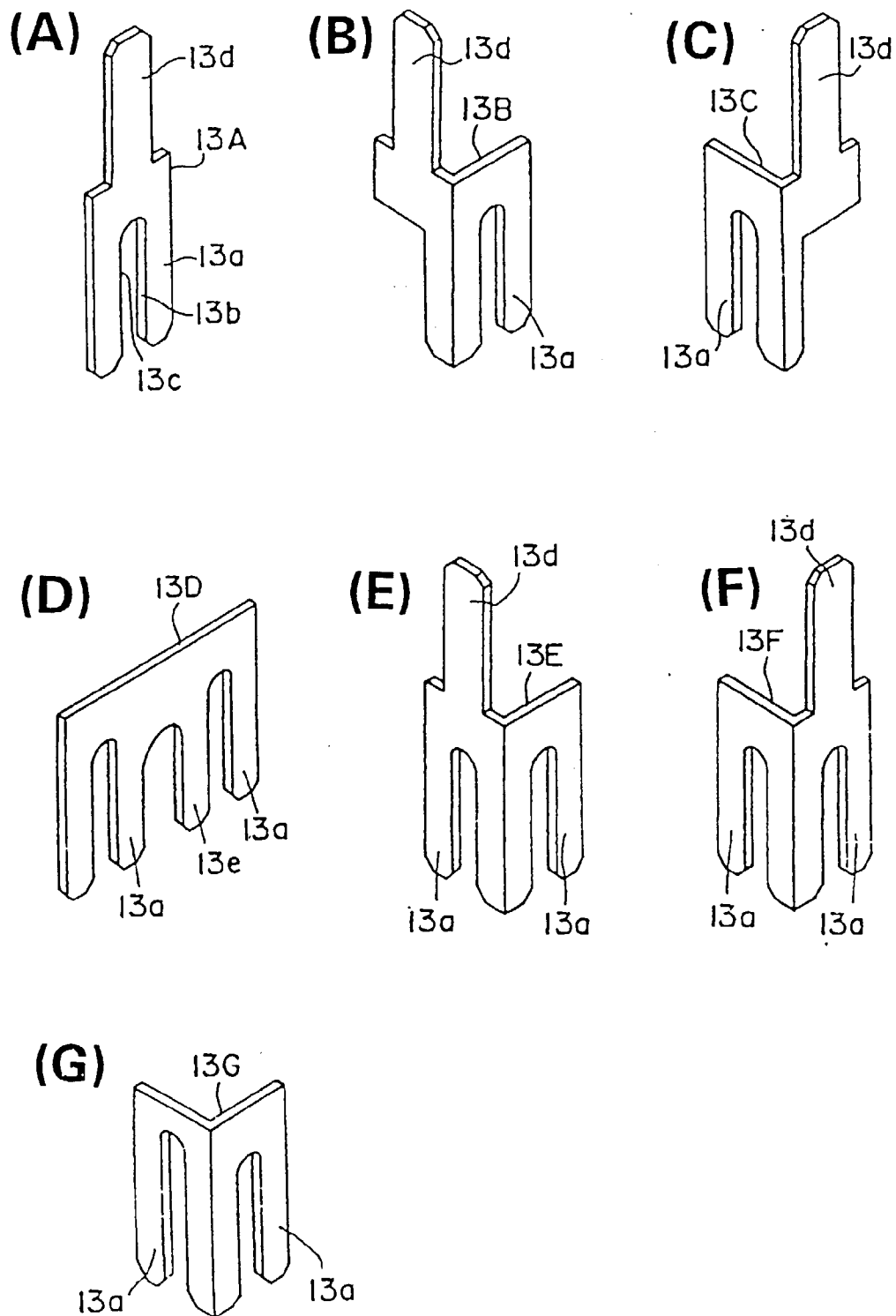


FIG. 4

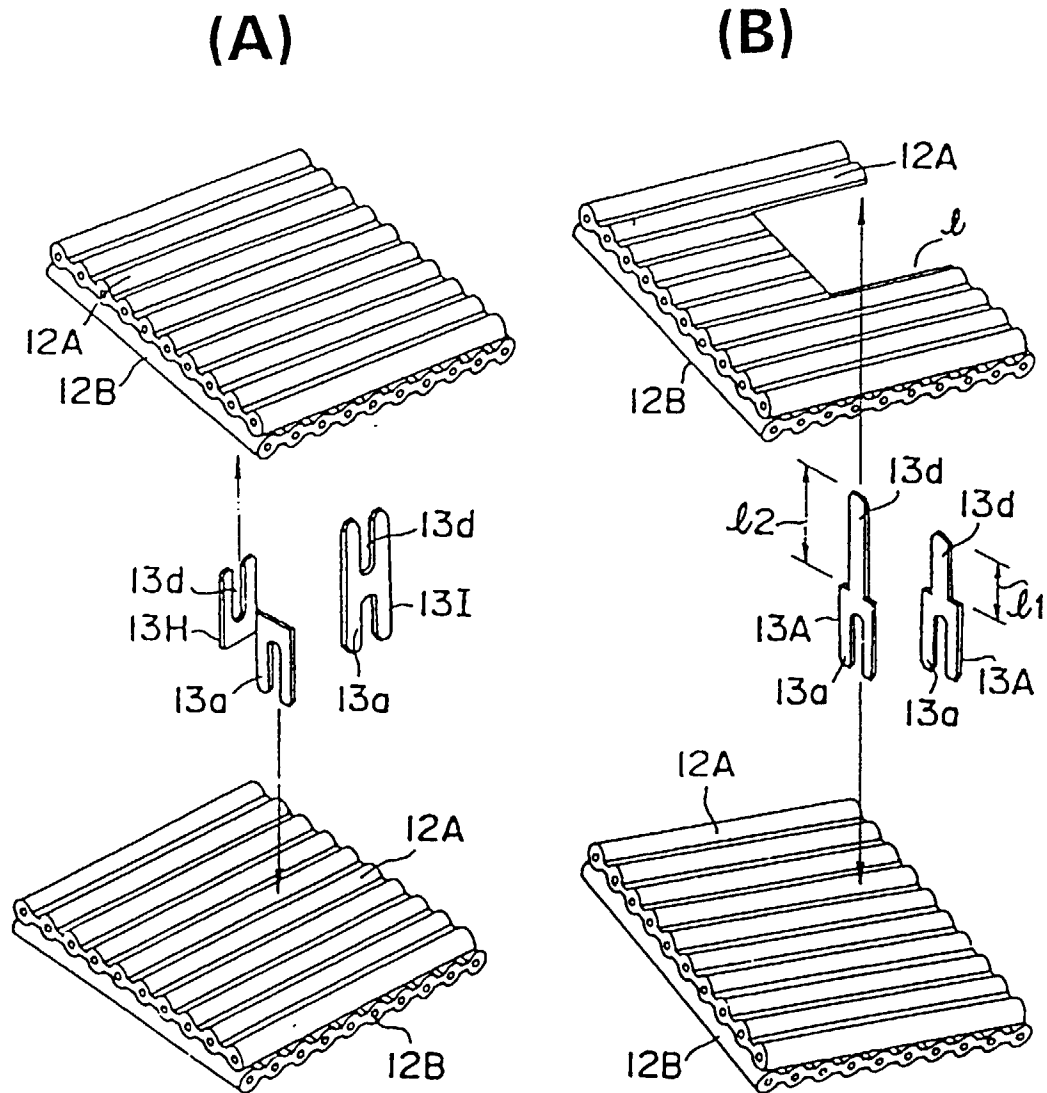


FIG. 5

PRIOR ART

